

Surgical Specimen Handover from Operation Theater to Laboratory: A Survey

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Abstract

Introduction: Essential communication between surgeons and pathologists is required when a specimen is transferred from operation theater to a laboratory. Any errors during transferring of specimen can lead to serious consequences such as wrong diagnosis, inappropriate treatment, reoperations, and physical and emotional disaster. **Aim:** To evaluate the incidence of mishaps and misses during the transfer of specimen from operation theater to pathology department. **Methodology:** This cross-sectional study was conducted among the oral and maxillofacial surgeons and postgraduate students of the Department of Oral and Maxillofacial Surgery. A self-administered questionnaire containing 15 questions pertaining to entry, collection, preservation, and transport of specimens to the laboratory was made. The questionnaire was validated and later distributed to the participants. **Results:** Our study showed that there are misses and mishaps during the entry, collection, preservation, and transport of specimen to the laboratory. 97.1% of participants reported that they require a checklist during the transfer of specimen. **Conclusion:** Use of checklist can reduce mishaps and communication failures which is an initial link for reporting.

Keywords: Artifacts, checklist, pathology, specimen transfer

INTRODUCTION

Essential communication between surgeons and pathologists is required when a specimen is transferred from operation theater to a laboratory. Errors can occur during the entry, collection, preservation, and transport of specimens to the laboratory.^[1] Any errors during transferring of specimen can lead to serious consequences such as wrong diagnosis, inappropriate treatment, reoperations, and physical and emotional disaster.^[2] In a study done in 1998, it was reported that specimen container and requisition labeling defects occurred in 6% of the cases.^[3]

The ability of the pathologist to interpret a biopsy depends upon both the quality and quantity of the specimen. Artifacts can occur in the tissue from the time the area is prepared for biopsy, during fixation, grossing, processing, sectioning, and staining of the specimen.^[4] The use of pins and needles in the specimen if not mentioned in the requisition form can lead to needle stick injuries to pathology staff.^[5] The use of traction sutures^[6] and powdered gloves^[4] can give rise to artifacts and if not mentioned can mislead to diagnosis.

The errors in surgical pathology can be reduced by better understanding the occurrence of errors and by providing a checklist that will be effective in reducing these errors. In this study, a survey was conducted among the oral and maxillofacial surgeons and postgraduate students of the Department of Oral and Maxillofacial Surgery regarding the details of transfer of the surgical specimen from operation theater to oral pathology laboratory. A checklist was also designed and developed for oral surgery to oral pathology department.

METHODOLOGY

This cross-sectional study was conducted among the oral and maxillofacial surgeons and postgraduate students of the Department of Oral and Maxillofacial Surgery with a sample

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size of 70. To evaluate the knowledge of the participants, a self-administered questionnaire containing 15 questions pertained to entry, collection, preservation, and transport of specimens to the laboratory was made. The Questionnaire has been attached below. The questionnaire was validated and later distributed to the participants. A web-based questionnaire was also developed using Google forms and was circulated. The participation of the subjects was kept voluntary and nobody was not obligated to fill the form. Questions were answered with “yes” or “no” or by marking the correct responses. Frequency analysis and percentage analysis were done with the obtained results.

RESULTS

The overall response for each question and the percent analysis were calculated for each question. Date was mentioned in the requisition form by 98.5% of the participants, 95.7% stated patient full name, 95.7% the identification number, and 97.1% date of birth/age of the patient, 48.5% the designation of the doctor, and 31.4% the contact number of the doctor. All the participants mentioned the type of specimen transferred and only 14.2% mentioned the time the specimen was removed.

95.7% labeled the specimen on the container. 54.2% placed a hazard symbol if the patient has any infectious disease. 100% of participants used formalin for fixation. 97.1% used 10% formalin for tissue fixation. 85.7% used powdered gloves during the surgical procedure. 38.5% mentioned in the requisition form if the vital staining techniques were used during the procedure. 42.8% mentioned about any foreign bodies in the specimen. Only 50% of the participants stated the pins/staples in the specimen. Rinsing of tissue with saline before placing in the fixative was done by 28.5% of the participants. Traction sutures if used during the procedure were mentioned by 27.1% [Figure 1]. 50% of the participants mentioned if the patient has undergone chemotherapy or radiotherapy earlier. 47.1% faced communication errors with the pathology department during the transfer of specimen and 97.1% reported that they require a checklist during the transfer of specimen [Figure 2].

DISCUSSION

Proper communication between a surgeon and a pathologist is important during the transfer of specimen to the laboratory.

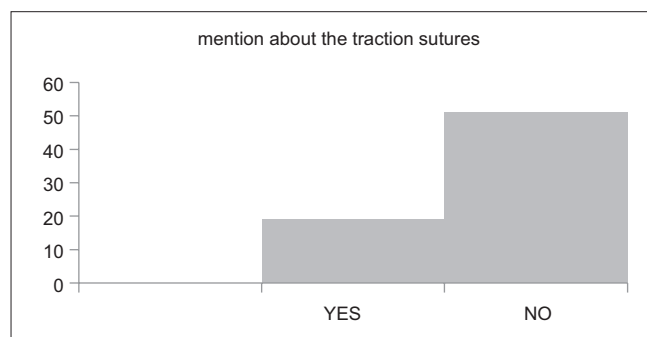


Figure 1: Number of participants mentioning about the use of traction sutures in the requisition form

Errors in the management of surgical specimen can occur during prelaboratory, laboratory, and postlaboratory phases.^[2] Errors can occur during entry, specimen collection, preservation, and transportation to the pathology laboratory.^[1]

Proper completion of the requisition form is essential as any labeling errors can result in inappropriate therapy or withholding of treatment for the patients.^[7] 98.5% of the participants mentioned date in the requisition form; this is important for proper identification of the patient and for the pathologists to know the time to start processing of the tissue. 95.7% stated patient full name in the requisition form; this is essential as any mistakes can lead to wrong diagnosis, reoperations, physical and emotional disaster, lengthy investigation, inappropriate treatment, and follow-up. 95.7% stated that they mention the identification number; this is required for proper identification of patient and to prevent incorrect diagnosis and treatment. 97.1% mentioned the date of birth/age; this is essential in the identification of age-related diseases. 48.5% mentioned the designation of the doctor and 31.4% mentioned the contact number of the doctor. This is important to contact the surgeon in case of any clarifications and details.

Compromised specimen can have severe implications in the diagnosis and treatment, particularly when the tissues cannot be replaced.^[8] 100% specified the type of specimen and 14.2% mentioned the time specimen was removed. This is significant as any delay in the fixation can cause cell shrinkage and cytoplasmic clustering.^[9] 95.7% participants labeled the specimen on the container. The label should be placed on the container rather than the lid to avoid any mix up of the specimens in the laboratory after opening.

Although fixation is necessary to preserve the morphology of the tissue, it by itself constitutes a major cause for artifact formation.^[4] If the procedure is not carried out properly. Artifacts can occur if the fixative does not have proper access to the tissues or because of the nature and quality of the particular reagent.^[10] Prolonged fixation can lead to secondary shrinkage and hardening; this can lead to separation of portion of tissues giving an appearance of empty spaces.^[4] 100% participants used formalin for fixation. 97.1% used 10% formalin. The optimal fixative used for tissue fixation is 10% formalin.^[4]

It is assumed that the blood and body substances of all the patients are potential sources of infection, regardless of

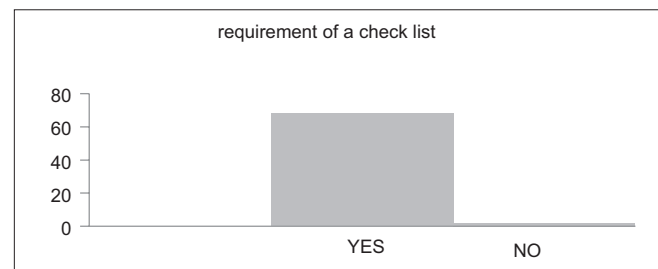


Figure 2: Number of participants who require a checklist during the transfer of specimen to laboratory

their diagnosis or any presumed infection status.^[11] Only 54.2% placed a hazard label if the patient has any infectious disease. This is essential to prevent communicable disease to the pathology staffs handling the specimen. Staffs should be educated about the potential hazards and transmissible disease from the specimen.

Artifacts refer to tissue alteration on a microscopic slide as a result of extraneous factors.^[6] These can lead to alteration in normal histology and cytological features and can lead to misdiagnosis.^[4] Only 38.5% mentioned if vital staining techniques were used before the biopsy procedure. Preparation of the site of biopsy with tincture or any other colored solution should be clearly mentioned as these can interfere with the tissue processing and staining methods.^[4]

Foreign body artifacts often make the interpretation of the biopsy specimen difficult.^[4] These can be encountered as a contaminant from paper or cotton gauze^[4] and can get implanted mechanically during dissection^[12] and give rise to artifact. 42.8% mentioned about any foreign bodies in the specimen. 85.7% of participants mentioned that they used powdered gloves during the surgical procedure. Powdered gloves have starch powder which is used for lubrication, may result in the starch artifact.^[4] These may resemble atypical epithelial cells.^[9] The starch granules are glassy, refractile, periodic acid–Schiff-positive bodies.^[4] They generally have spore-like structures with a dark central area which can be misinterpreted as a pyknotic nucleus or mitosis.^[4] Hence, it is important to mention if powdered gloves were used during the procedure.

Seoane *et al.* reported that hemorrhages and splits are the most frequently found artifacts in incisional oral biopsies.^[13] Traction sutures if used were mentioned only 27.1%: This is important as these traction sutures may give rise to crush injuries, hemorrhage, splits, and fragmentation of the tissues.^[14] Silk sutures exhibit a strong birefringence under polarized light, which can be useful in their identification.^[4] The formalin binds with heme from red blood cells to form a heme pigment that forms black precipitate in the tissue.^[15] 28.5% rinse the specimen with saline before placing in fixative.

Needlestick injuries are serious occupational hazard as this can lead to transmission of variety of blood-borne pathogens such as hepatitis B virus, hepatitis C virus, and human immunodeficiency virus.^[16] 50% of participants mentioned in the requisition form if pins or staples are placed in the specimen. The use of pins and needles in the specimen if not mentioned in the requisition form can lead to needle stick injuries to the pathology staffs.^[5] 50% participants mentioned if the patient has undergone chemotherapy or radiotherapy earlier. Radiation can lead to mucositis, fibrosis, soft-tissue necrosis, osteoradionecrosis, etc.^[17] Hence, it is important to mention these details in the requisition form. 47.1% faced communication error when specimen was transferred to pathology department and 97.1% reported that they require a checklist during the transfer of specimen.

These errors can be reduced by read-back verification of these details by the surgeon, the scrub nurse, and the circulatory nurse. Technology-based solution such as bar code-based tracking can be implemented. Careful handling of tissues with appropriate fixation and transport helps the pathologist to give a confident histological diagnosis. We have designed a checklist which can reduce the chances of error during the transfer of the specimen. A prospective multicentric trial is planned in the future.

CONCLUSION

Change always requires identification of root causes and cross-functional team involvement. This method of analyzing, preventing, and mitigating the medical errors can help to provide the best treatment plan and improve patient safety and quality of care.

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Conflicts of interest

There are no conflicts of interest.

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CHECKLIST – FOR SPECIMEN TRANSFER FROM OPERATION THEATER TO LABORATORY

Does the patient have any infectious disease?

Are there any Pins/staples in the specimen

Date

Label the sample on the container

Patient full name

Identification number

Date of birth/age

Designation of doctor

Contact number of the doctor

Type of specimen

Time the specimen was removed

Was vital staining techniques used before biopsy?

Did you rinse the specimen with saline before placing in the fixative?

Did you use traction sutures while removing the tissue?

Has the patient undergone radiotherapy or chemotherapy before?

Powdered/nonpowdered gloves?

Fixed the tissue in 10% formalin?

Additional Details:

Signature

QUESTIONNAIRE

Surgical specimen handover from operation theatre to laboratory – misses and mishaps

1. Do you mention the following details in the patient requisition form?
 - a. Date Yes/no
 - b. Patient full name yes/no
 - c. Identification number yes/no
 - d. Date of birth/age yes/no
 - e. Designation of the doctor yes/no
 - f. Contact number of the doctor yes/no
2. Do you label the sample on the
 - a. Lid
 - b. Container
 - c. Do not label
3. Do you clearly mention the following details in the requisition form?
 - a. Type of specimen Yes/no
 - b. Time the specimen was removed Yes/no
4. What fixative do you use?
 - a. Formalin
 - b. Saline
 - c. Local anesthetic solution
 - d. Others

5. What is the percentage of formalin used for fixation?
 - a. 10%
 - b. 40%
 - c. 50%
6. Do you place a hazard label if the patient has any infectious disease?
Yes/no
7. Do you mention in the requisition form if there are any foreign bodies in the sample?
Yes/no
8. Do you mention if the patient has undergone chemotherapy or radiotherapy before?
Yes/no
9. Do you mention if there are any pins/staples in the specimen?
Yes/no
10. Do you mention if vital staining techniques were used before biopsy?
Yes/no
11. After taking the specimen do u rinse with saline before placing in the fixative?
Yes/no
12. Do you mention if traction sutures were used while removing the tissue?
Yes/no
13. Do you use a powdered gloves/non powdered gloves during the biopsy procedure?
Powdered/nonpowdered
14. Have you ever faced any communication error when the specimen was transferred to the pathology department?
Yes/no
15. Do you think a check list is required for the transfer of specimen to the pathology lab?
Yes/no